

Successful arthroscopic treatment of a rare bacterial arthritis of the shoulder due to *Salmonella* Enteritidis

Konstantinos Tolis, Panagiotis Anastasopoulos, Sarantis Spyridonos, Emmanouil Fandridis

Hand surgery, Upper limb and Microsurgery Department, General Hospital KAT

ABSTRACT

Septic arthritis of the shoulder is a rare entity in the developed world. It is mainly reported in infants of sub-Saharan countries and the southeastern Asia. When the causative bacteria are unusual, diagnosis is challenging due to the atypical presentation of the disease. Treatment options are still under consideration and a standard surgical and pharmaceutical protocol in non-gonococcal monoarthritis has not been established. We report a case of septic shoulder arthritis due to *Salmonella enteritidis*, treated effectively with extensive arthroscopic lavage and antibiotics.

KEY WORDS: shoulder; *Salmonella enteritidis*; septic arthritis; arthroscopy

Introduction

Septic arthritis mainly develops as a result of haematogenous seeding of bacteria into the synovial joint. Joint arthroplasties, needle aspirations or local corticosteroid injections have been correlated with an increase of septic inoculations over the past two decades. Bacterial arthritis may arise secondary to penetrating trauma or after blunt trauma to the joint without skin breakage. Septic arthritis of the shoulder is a rare finding in the developed world, although many cases have been reported in sub-Saharan Africa and Southeastern Asia [8]. Septic shoulder arthritis due to *Salmonella enteritidis* is extremely rare with only a few documented cases [3].

Case presentation

A 73-year old male presented with persistent left shoulder pain, lasting 15 days, without relief after treatment with Non Steroid Antiflammatory Drugs (NSAID), paracetamol and rest. He reported an episode of a fall onto his left shoulder one month earlier without any penetrating trauma or fracture. At the time of admission no fever or any other systematic infection was observed. However, edema, redness and complete limitation of passive and active range of motion of the left shoulder were documented. His medical history revealed hypertension under medication and previous shoulder pain episodes. The patient reported a

CORRESPONDING
AUTHOR,
GUARANTOR

Konstantinos Tolis, MD, M.Sc., M.Sci.
Epidamnou 53-55, Athens, Greece, 11254, Tel: 00302102230758
E-mail: dctolis@gmail.com



Fig. 1. Posteroanterior radiography of the left shoulder preoperatively. No signs of infection are detected



Fig. 2. T1 weighted MRI of the left shoulder showing no intramedullary or metaphyseal oedema or lesions, precluding the osteomyelitis

corticosteroid injection into his left shoulder joint ten years ago.

During admission, blood tests revealed a total leukocyte count of 10,900 cells/ μ l with 83% polymorphonuclear cells, an Erythrocyte Sedimentation Rate (ESR) of 56 mm/hr (normal range 0-10 mm/hr) and a C-Reactive Protein (CRP) level of 6.51 ng/l (normal range <10 ng/l). A simple posteroanterior radiographic evaluation of the left shoulder showed no abnormality (**Fig. 1**). Magnetic resonance imaging revealed decreased and increased signal intensity on T1- and T2-weighted images respectively, indicating complete tear of the posterior rotator cuff, joint effusion and subacromial bursitis (**Fig. 2,3**).

Joint aspiration was performed at the time of admission and 120 cc of turbid fluid were sent for culture analysis. Blood cultures were also sent for analysis. Routine treatment, with intravenous ciprofloxacin (400 mg every 12 hours) was adminis-

tered to the patient. A shoulder arthroscopy was performed two days later. Joint fluid was collected through the arthroscopic sheath and sent for analysis. During glenohumeral joint arthroscopy, cartilage was normal, intra-articular portion of the long head of the biceps was frayed and the subscapularis tendon was intact. Excessive subacromial fluid, extended subacromial bursitis and inflammatory tissue were observed. Posterior cuff tear was confirmed. Synovectomy, tenotomy of the long head of the biceps, debridement of the bursa of the tendons at the subacromial space and extended lavage with saline solution were performed.

All joint fluid cultures revealed the bacteria of *Salmonella enteritidis*, which was found to be sensitive to the antibiotics ciprofloxacin and amoxicillin. Blood cultures were negative for *Salmonella* species. Stool cultures were also sent with negative results for *Salmonella enteritis*. Antibiotic therapy was converted



Fig. 3. Coronal T2-weighted MRI of the left shoulder demonstrates large rotator cuff tear, joint effusion, fluid concentration on the subacromial space and bone marrow oedema

to intravenous ciprofloxacin and amoxicillin for 3 weeks. Postoperatively a significant improvement was documented as pain, redness and edema of the shoulder were reduced. The patient commenced passive and assisted active shoulder motion on the second postoperative day.

Inflammation markers were decreased gradually. Oral ciprofloxacin (500 mg every 12 hours) and amoxicillin (1 gr every 12 hours) were prescribed for 4 weeks after discharge of the patient. ESR and CRP levels were monitored for three months until normalization, and no signs of recurrence were documented during the 24-months follow up period. Bone scan scintigraphy with technetium-99m methylene diphosphonate revealed no uptake of the radioisotope in the affected joint (**Fig. 4**), six months postoperatively. At 2 year follow up the patient remains asymptomatic.

Discussion

Septic arthritis of the shoulder joint is a rare event. It involves about 3% of joint infections⁵. Bacteremia, rheumatoid arthritis, corticosteroid therapy and immunodeficiency are the most common risk factors. Early diagnosis is crucial, in order to prevent cartilage and soft tissue damage, relief the patient

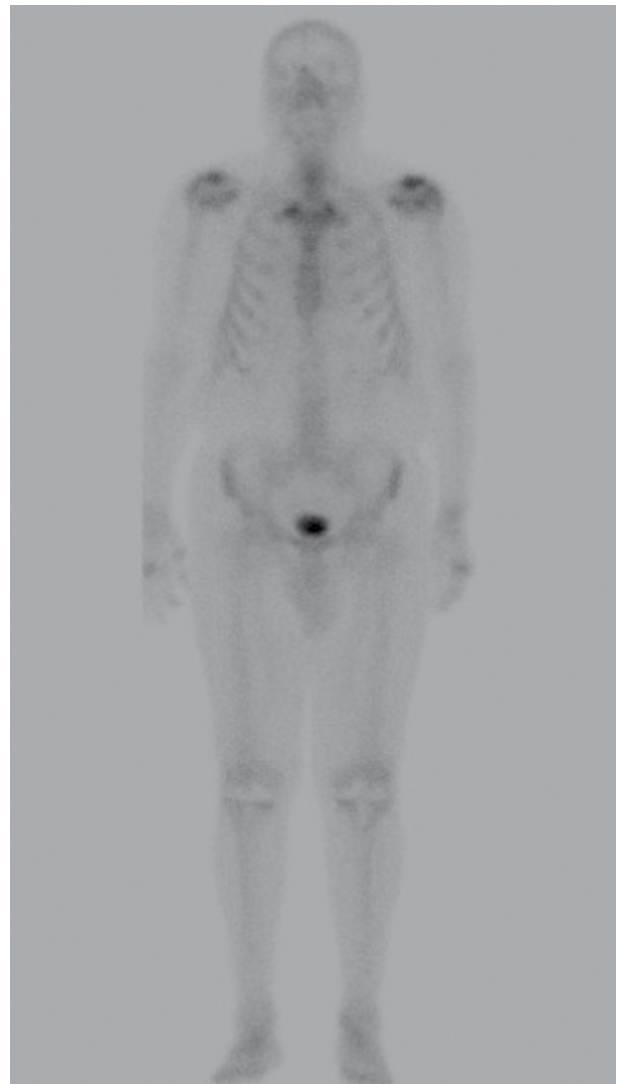


Fig. 4. Bone scan scintigraphy with technetium - 99 m methylene diphosphonate at four months postoperatively. No uptake of the radioisotope in the affected joint was detected

from persistent pain and restore range of shoulder motion. Clinical presentation of acute non-gonococcal arthritis of the shoulder includes pain, warmth, swelling and a decreased range of motion [3]. A mild fever is common, although was not recorded in our case [3] probably due to painkillers and anti-inflammatory drugs that our patient received before admission. Immediate joint aspiration, complete blood tests (including ESR and CRP), and blood cultures should be performed.

Staphylococcus aureus is the most common bacterium [4] diagnosed in monoarticular septic arthritis in patients older than 65 years old, while *Salmonella enteritidis* is rarely detected in adult septic arthritis. The rates of septic arthritis and osteomyelitis due to *Salmonella* species are less than 1% and it usually affects infants and children in tropical Africa, sub-Saharan and Southeastern Asia [8]. Our case is one of the few ever reported in an adult and the second case to our knowledge, involving the shoulder joint and the *Salmonella enteritidis* in Europe [1]. Although bacteremia, local injection or immunodeficiency is the main causes for shoulder septic arthritis due to *Salmonella enteritidis*, in our patient it is controversial. A case was reported recently where septic arthritis developed 19 years post an episode of *Salmonella gastroenteritis* [2]. Our patient did not mention a recent episode of gastroenteritis and stool culture was negative for any species. Though, a local corticosteroid injection on the affected shoulder ten years ago was reported in this case, and moreover no clear factors could be considered as a cause for the shoulder infection in our patient. Blunt trauma of the affected shoulder and the advanced age of the patient could be reported as possible

Inflammatory markers such as ESR, CRP and leucocyte counts are usually normal in acute non-gonococcal arthritis, although in our case they were increased. Joint aspiration should be performed upon arrival, and the joint fluid should be immediately sent for aerobic, anaerobic, mycobacterial, fungal and *Propionibacterium acnes* culture. Blood cultures and antibiotic sensitivities should be determined. Upon suspicion of *Salmonella enteritidis* stool cultures must also be sent.

An MRI is useful to detect any soft tissue damage or infiltrating bone infection. Our patient, despite x-rays evaluation of the shoulder, underwent MRI of the infected shoulder in order to exclude a possible acute, or even chronic, osteomyelitis of the humerus. A three-phase ^{99m}Tc methylphosphonate scan was suggested 6 months postoperatively, to exclude any recurrence of the disease.

The aim of treatment is to decompress and prevent potential damage to the joint, relief from pain and restore range of shoulder motion. Joint aspiration, which was performed at the time of admission of the patient, was not the final treatment. Arthroscopic lavage was performed, as the appropriate surgical procedure to our patient. It is a minimal invasive technique, allowing excellent inspection of the infected joint, giving the opportunity of further surgical invasion, if recurrence occurs [9]. Postoperative splinting in a neutral position and rest minimizes pain, while progressive rehabilitation with passive and active exercises may lead to previous range of motion.

Antibiotic therapy is crucial for acute septic arthritis. Since septic arthritis is a rare disease, there is little evidence regarding the choice and duration of antibiotic treatment. Usually second or third generation cephalosporin is used when gram-negative microorganisms are suspected [6]. Ciprofloxacin was chosen, though not considered a first line agent [7], due to the atypical clinical case and previous experience, and amoxicillin was added according to the antibiogram. Antibiotic sensitivities, after joint cultures, matched our choice and amoxicillin was added. Data is limited, concerning exact guidelines for the pharmacologic treatment of septic arthritis due to gram negative bacteria.

As a conclusion, septic arthritis due to *Salmonella enteritidis* outside Asia or Africa is extremely rare. Diagnosis should be considered, when involving monoarthritis in elderly population. Arthroscopic lavage is a minimal and effective procedure, when dealing with joint sepsis in order to prevent the cartilage damage. Further studies may provide more specific guidelines, concerning empirical antibiotic therapy in septic arthritis. 

Conflict of interest:

The authors declared no conflicts of interest.

The study was performed at the Hand surgery, Upper limb and Microsurgery Department at General Hospital KAT in Athens (Greece).

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ΠΕΡΙΛΗΨΗ

Η σηπτική αρθρίτιδα του ώμου είναι μια πολύ σπάνια οντότητα. Αναφέρεται στη διεθνή βιβλιογραφία σε περιπτώσεις από την υπο-Σαχάρια Αφρική και την νότιο-ανατολική Ασία. Στις περιπτώσεις που οι παθογόνοι μικρο-οργανισμοί είναι σπάνιοι, η διάγνωση είναι δυσχερής λόγω της ατυπίας των συμπτωμάτων. Στη μη-γονοκοκκική αρθρίτιδα, τα θεραπευτικά πρωτόκολλα είναι ασαφή όσον αφορά την φαρμακευτική αγωγή και τη χειρουργική αντιμετώπιση. Παρουσιάζουμε μια περίπτωση σηπτικής αρθρίτιδας του ώμου από *Salmonella enteritides* που αντιμετωπίστηκε με φαρμακευτική αγωγή και εκτεταμένη αρθροσκοπική έκπλυση.

ΛΕΞΕΙΣ ΚΛΕΙΔΙΑ: σηπτική αρθρίτιδα, ώμος, σαλμονέλλα